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#### Remarks

Claims 1-31 remain in the above captioned application. Claims 1-5 and 7-31 have been rejected. Claim 6 has been objected to as dependent from a rejected claim. For the below stated reasons, the Examiner's rejections of claims 1-5 and 7-31 have been shown to be improper and the Examiner is respectfully requested to withdraw the rejections of claims 1-5 and 7-31 and allow claims 1-5 and 7-31. In addition, new claims 32 - 44 have been added and should be allowable and the Examiner is respectfully requested to allow claims 32 - 44.

The Drawings have been objected to for including reference numerals not referenced in the Specification. The specification has been amended to remove this objection. The Examiner is, therefore, respectfully requested to withdraw the rejection to the Drawings.

The Abstract has been objected to for containing certain improper words and phrases and as not being in a narrative form. The Abstract has been amended to remove this objection. The Examiner is, therefore, respectfully requested to withdraw the objection to the Abstract.

Claims 1-4, 7, 12-15 and 19-21 have been provisionally rejected for non-statutory or "obviousness" double patenting over co-pending U.S. application 09/803,320 filed on March 9, 2001, ("Pletner") in view of Jacques, On-Line System Identification and Control Design for Flexible Structures ("Jacques").

Applicant does not concede that any of the above referenced claims are obvious in light of the combination of Pletner and Jacques. Nevertheless, applicant hereby submits a Terminal Disclaimer to overcome the rejections of claims 1-4, 7, 12-15 and 19-21 for obviousness double patenting.

For the above stated reasons, the Examiner's rejection of claims 1-4, 7, 12-15 and 19-21 for double patenting is improper and the Examiner is respectfully requested to withdraw the rejection of claims 1-4, 7, 12-15 and 19-21 and allow claims 1-4, 7, 12-15 and 19-21.

Claims 27 and 28 have been rejected under 35 U.S.C. §101, as directed to "non-statutory subject matter." The Examiner has taken the position that "[t]he claims are

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directed to neither a 'process' nor a 'machine,' but rather embraces or overlaps two different statutory classes of invention set forth in 35 U.S.C. 101 . . . ."

Claims 27 and 28 have been amended to correct the obvious typographical error in dependency of the claims to the prior claim 26 rather than claim 23, which is an apparatus claim and does not contain the recited method elements recited in claims 26, 27 and 28. This amendment is made solely for the purposes of correcting this obvious clerical error and not with the intent or the effect of distinguishing the claimed inventions in claims 27 or 28 over any prior art or to narrow the claimed invention from what would have been claimed originally had the improper dependency not been recited.

For the above stated reasons, the Examiner's rejection of claims 27 and 28 are improper and the Examiner is respectfully requested to withdraw the rejections of claims 27 and 28 and allow claims 27 and 28.

Claims 18 and 22-24 stand rejected under 35 U.S.C. §112, first paragraph, for failing to comply with the written description requirement. The Examiner has taken the position that "[t]he claim(s) contains subject matter which was not described in the specification . . . Claim 18 [and claims 22-24] recites a further limitation that the relation is fully coupled, which is not disclosed in the specification." The Specification has been amended to reference the "fully coupled" feature, which, as part of the claims as filed, was in the disclosure of the above captioned application as filed and the Specification has merely been amended to conform to the disclosure contained in the claims as filed.

Claims 27 and 28 have also been rejected under 35 U.S.C. §112 for the reasons noted above and addressed above with respect to §101.

For the above stated reasons, the Examiner's rejections of claims 18, 22-24, 27 and 28 have been rendered improper and the Examiner is respectfully requested to withdraw the rejection and allow claims 18, 22-24, 27 and 28.

Claims 1-3, 5, 7, 10, 12, 17, 25-27 and 29-31 have been rejected under 35 U.S.C. §102 (b) as anticipated by United States patent No. 5,299,459, entitled ADAPTIVE CONTROL METHOD FOR MULTIEXCITER SINE TESTS, issued to Underwood on April 5, 1994, based upon an application Ser. No. 576416, filed on May 15, 1991, with priority to May 21, 1990 ("Underwood").

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Contrary to the assertions of the Examiner, Underwood does not contain a processor that is "capable of ... estimating a behavioral model," and particularly not by "adapt[ing] the initial behavioral model to an updated model ... ." As noted in the portion of Underwood cited by the Examiner, Underwood operates to "to refine an estimate of system impedance values during the control process for causing a control point response spectral vector to agree with the *desired reference spectral vector*. As with previous swept-sinewave controllers, the inventive controller functions by employing a feedback control algorithm ... ." (Col. 3, lines 9-14, emphasis added) Underwood further states:

However, as is also explained previously herein, while the digital processing system 24, as defined thus far, will attempt to cause the control response vector 34 to converge on the reference vector 36 values, it implicitly uses assumptions that the system impedance matrix 44 is an accurate measure of actual system characteristics under dynamic test conditions. (Col. 6, lines 8-15, emphasis added)

Unlike the current invention, Underwood says nothing of ever modifying this desired reference or reference spectral vector. The Examiner himself has referred to this desired vector as referred to in Underwood as both the "initial behavioral model" and "updated model" as claimed in claim 1, whereas Underwood says noting of ever updating this "reference vector" disclosed in Underwood.

Underwood is simply a prior art feedback system that has an improved way for the system to react to errors between the actual responses of the system and the desired responses of the system indicated by the feedback.

There is, therefore, also not found in Underwood a "tunable controller" as disclosed and claimed in claim 1 of the above captioned application.

Neither is there anything in Underwood that "combines the updated model with a universal filter to create a relation that describes the behavior of the apparatus and creates a controller based on the relation such that the controller is tuned ..." Underwood does not create the claimed "updated model" so Underwood cannot combine the updated model with anything, much less with a "universal filter," which in any event is also not disclosed in Underwood, and Underwood does not then create a new tuned controller.

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Reference to element 36 in FIG. 2<sup>1</sup> of Underwood simply reinforces the point that this "Reference Spectrum Matrix," or as referenced above referred to "reference vector 36 values," is not modified during the operation of the feedback system of Underwood. The portion of Underwood in Col. 5, lines 10-20 is not availing of the Examiner's position either. This portion of the Specification of Underwood states:

The control response vector 34 is compared to a reference spectrum vector 36 at a first comparator 38. A control error vector 40 results from the first comparator 38. Individual values of the control error vector 40 will be positive where corresponding reference spectrum vector 36 values are higher than control response vector 34 values, and negative where reference spectrum vector 36 values are lower than control response vector 34 values. A compensated error matrix 42 is produced by adjusting the control error vector 40 according to a system impedance matrix 44. (Col. 5, lines 10-20)

This, once again, simply refers to an invariable "reference spectrum vector," and the "control error vector" is simply a modifying input to a standard feedback loop as shown in FIG. 2 of Underwood.

It is to be noted also that even the "system response matrix" referenced in the specification as 46, but unlabeled as such in FIG. 2 of Underwood, is disclosed to be preset and not variable during operation of the system feedback loop of FIG. 2 of Underwood. (Col. 6, lines 1-7)

For the above stated reasons, the Examiner's rejection of claim 1 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 1 and allow claim 1.

Claim 2 is dependent from allowable claim 1 and should be allowed for that reason. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

For the above stated reasons, the Examiner's rejection of claim 2 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 2 and allow claim 2.

As to claim 3 the Examiner has taken the position that Underwood discloses the claimed recitation "the relation is formulated as an optimal control problem" in Col. 6,

<sup>1</sup> Element 36 is not actually labeled in FIG. 2, but is referenced in the text as "reference vector values."

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lines 36-39. Underwood may disclose the use of "optimization theory" and "control problem theory," but does not disclose the claimed "relation," which is created by a combination of "the updated model with a universal filter" and which "relation" "describes the behavior of the apparatus." Therefore, claim 3 is not anticipated by Underwood.

For the above stated reasons, the Examiner's rejection of claim 3 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 3 and allow claim 3.

Claim 5 has been rejected under 35 U.S.C. §102 (b) over Underwood, since the Examiner states that Col. 5, lines 10-18, and FIG. 2 element 36, referenced above, which the Examiner has also referred to as the claimed "initial model" and the claimed "updated model," also anticipates the claimed "universal filter." Applicant submits that the "reference spectral matrix," of Underwood is not the claimed "universal filter" as disclosed and claimed in the above captioned patent application.

In addition, claim 5 depends from allowable claim 1 and should be allowed for that reason. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

For the above stated reasons, the Examiner's rejection of claim 5 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 5 and allow claim 5.

Claim 7 has been rejected under 35 U.S.C. §102 (b). The Examiner has taken the position that Underwood in FIG. 1, element 10, 14 and 20 and Col. 4, line 60 – Col. 5, line 10 anticipates claim 7.

Claim 7 recites a "digital signal processor (DSP)." It is well known in the art, and was at the time of the filing of the above captioned application, that a DSP is a specialized form of digital processor, which is ordinarily implemented on a single integrated circuit chip, and which may have on it specialized digital circuitry, for specialized processing, e.g., high speed multipliers or dividers or floating point circuitry, or may have built-in analog to digital and/or digital to analog converters, or may have other mixed signal (analog and digital signals) or other specialized signal processing circuitry. A digital processing system dealing with digital representations of analog signals in a purely digital environment which is what Underwood describes in the cited

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FIG. and text is not the claimed DSP. For that reason, Underwood does not anticipate claim 7.

In addition, claim 7 depends from allowable claim 1 and should be allowed for that reason. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

For the above stated reasons, the Examiner's rejection of claim 7 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 7 and allow claim 7.

Claim 10 depends from allowable claim 1 and should be allowed with claim 1. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

For the above stated reasons, the Examiner's rejection of claim 10 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 10 and allow claim 10.

Claim 12 depends from allowable claim 1 and should be allowed with claim 1. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

For the above stated reasons, the Examiner's rejection of claim 12 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 12 and allow claim 12.

Claim 13 depends from allowable claim 1 and should be allowed with claim 1. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

For the above stated reasons, the Examiner's rejection of claim 13 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 13 and allow claim 13.

Claim 14 has been rejected under 35 U.S.C. §102 (b) as anticipated by Underwood. The Examiner has taken the position that Col. 3, lines 61-65, Col. 4, lines 46-48 and Col. 5, lines 44-61 of Underwood anticipate claim 14.

The referenced portions of Underwood indicate at best that variables of the system being measured/controlled by the apparatus and method of Underwood vary with frequency. (Col. 3, lines 61-65) Underwood does not appear to disclose any sensor that "gathers frequency data" nor that "the accuracy of the updated model is adjustable as a function of the gathered frequency data" especially since, as noted above, Underwood

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discloses no "updated model" as disclosed and claimed in the above captioned application. For these reasons, claim 14 is not anticipated by Underwood.

In addition, claim 14 depends from allowable claim 1 and should be allowed for that reason. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

For the above stated reasons, the Examiner's rejection of claim 14 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 14 and allow claim 14.

Claim 15 has been rejected under 35 U.S.C. §102 (b).

Claim 15 depends from allowable claim 1 and should be allowed with claim 1. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

For the above stated reasons, the Examiner's rejection of claim 15 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 15 and allow claim 15.

Claim 17 has been rejected under 35 U.S.C. §102 (b) as anticipated by Underwood. The Examiner has taken the position that Underwood in Col. 6, lines 36-42 anticipates the claimed "wherein the updated model is a model of minimal order."

Applicant does not believe that the cited portion of Underwood refers to a model of "minimal order," however, even if it does, Underwood, as described above does not disclose the claimed "updated model." Therefore Underwood does not anticipate claim 17.

In addition, claim 17 depends from allowable claim 1 and should be allowed with claim 1. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

For the above stated reasons, the Examiner's rejection of claim 17 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 17 and allow claim 17.

Claim 25 has been rejected under 35 U.S.C. §102 (b) as anticipated by Underwood. For the above stated reasons, in regard to the rejection of claim 1, Underwood as referenced by the Examiner does not disclose the elements of claim 25 including "updating the initial behavioral model," "using the updated behavioral model in conjunction with a universal filter to create a command structure," and/or "causing the

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physical system to behave in accordance with the [so created] command structure." Further as noted above, it is not understood that Underwood measures "frequency data."

For the above stated reasons, the Examiner's rejection of claim 25 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 25 and allow claim 25.

Claim 26 has been rejected under 35 U.S.C. §102 (b) as anticipated by Underwood. For the above stated reasons, applicant submits that Underwood does not disclose, at least "A method for creating an updated model for the motion characteristics of a physical system," "the updated model governing the actions of a system controller," "updating the stored model by comparing the gathered data to the stored model," "iteratively adapting the stored model until the stored model predicts the motion characteristics of the system," or "storing the updated model."

For the above stated reasons, the Examiner's rejection of claim 26 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 26 and allow claim 26.

Claim 27 has been rejected under 35 U.S.C. §102 (b) as anticipated by Underwood.

As noted above, applicant has found no disclosure in Underwood of "acquiring a frequency response," however, even if there is such in Underwood, claim 27 (as amended) depends from allowable claim 26 and should be allowed with claim 26. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988).

For the above stated reasons, the Examiner's rejection of claim 27 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 27 and allow claim 27.

Claim 29 stands rejected under 35 U.S.C. §102 (b) as anticipated by Underwood.

As noted above, Underwood does not disclose at least, "updating the first mathematical model to generate a second mathematical model," "updating the first controller using the updated mathematical model and the filter," "to create and solve an optimal control problem and thereby generate a second controller," and/or "such that the motion induced when a second signal is applied to the mechanical apparatus is well-predicted."

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For the above stated reasons, the Examiner's rejection of claim 29 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 29 and allow claim 29.

Claim 30 has been rejected under 35 U.S.C. §102 (b) as anticipated by Underwood.

As noted above, Underwood does not disclose, at least, "applying a universal filter to the input from the user," "to create a user-defined behavioral range," "creating a problem specification from the identification of the system and the behavioral range," and/or "solving the problem specification, thereby creating the controller."

For the above stated reasons, the Examiner's rejection of claim 30 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 30 and allow claim 30.

Claim 31 has been rejected under 35 U.S.C. §102 (b) as anticipated by Underwood.

As noted above, Underwood does not disclose, at least, "means for applying the universal filter to the input from the user," "to create a user-defined behavioral range," "means for creating a problem specification from the identification ... and the behavioral range," and/or "means for solving the problem specification, thereby creating the controller."

For the above stated reasons, the Examiner's rejection of claim 31 under 35 U.S.C. §102 (b) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 31 and allow claim 31.

Claims 4, 19-21 and 28 have been rejected under 35 U.S.C. §103 (a) as being unpatentable over Underwood in view of Jacques.

The Examiner has taken the position that Underwood anticipates the claims 1 and 26 from which, respectively, claims 4 and 19-21, and claim 28 depend and that Jacques provides the remaining recited mathematical relationships.

Even assuming, without conceding, that Jacques discloses the remaining claim recitations of, respectively, claims 4 and 19-21 and claim 28, for the above stated reasons, claims 1 and 26 are not anticipated by Underwood. Therefore, the Examiner has failed to make out a *prima facie* case of obviousness, since the asserted combination of

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Underwood and Jacques does not result in all of the claimed recitations in, respectively, claims 4 and 19-21 and claim 28, to the same degree that elements of claims 1 and 26, as discussed above, are not found in Underwood.

For the above stated reasons, the Examiner's rejection of claims 4, 19-21 and 28 under 35 U.S.C. §103 (a) is improper and the Examiner is respectfully requested to withdraw the rejection of claims 4, 19-21 and 28 and allow claims 4, 19-21 and 28.

Claim 8 is rejected under 35 U.S.C. §103 (a) as unpatentable over Underwood in view of Robinson. For the above stated reasons, the Examiner has not made out a *prima facie* case for obviousness, even if Robinson contains the additional elements recited in claim 8, which applicant does not deny or concede.

For the above stated reasons, the Examiner's rejection of claim 8 under 35 U.S.C. §103 (a) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 8 and allow claim 8.

Claim 9 is rejected under 35 U.S.C. §103 (a) as unpatentable over Underwood in view of Yamunachari. For the above stated reasons, the Examiner has not made out a *prima facie* case for obviousness, even if Yamunachari contains the additional elements recited in claim 9, which applicant does not deny or concede.

For the above stated reasons, the Examiner's rejection of claim 9 under 35 U.S.C. §103 (a) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 9 and allow claim 9.

Claim 16 stands rejected under 35 U.S.C. §103 (a) as unpatentable over Underwood in view of Araie et al. For the above stated reasons, the Examiner has not made out a *prima facie* case for obviousness, even if Araie et al. contains the additional elements recited in claim 16, which applicant does not deny or concede.

For the above stated reasons, the Examiner's rejection of claim 16 under 35 U.S.C. §103 (a) is improper and the Examiner is respectfully requested to withdraw the rejection of claim 16 and allow claim 16.

For the above stated reasons, the Examiner's rejections of claims 1-5 and 7-31 and objection to claim 6 have been rendered improper and the Examiner is respectfully requested to withdraw the rejection of claims 1-31 and allow claims 1-31. New claims 32

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- 44 should also be allowable and the Examiner is respectfully requested to issue a timely allowance of all of claims 1-44.

Claim 1 has also been amended to correct a clerical error resulting in improper antecedent basis for "gathered" data.

Claim 6 has been amended to clarify the claim which as written could be interpreted not to conform the Specification (e.g., Fig. 1).

Claim 21 has been amended to correct a clear typographical error.

These amendments to claims 1, 6, and 31 are made solely to correct clerical or typographical errors and/or clarify the claims by conforming to the description of the claimed invention in the Specification and not for the purpose of defining over any prior art and should not have the effect of narrowing the scope of the claims beyond the scope of the claims had they been originally filed without the now corrected errors.

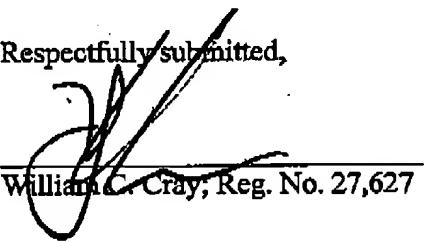
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### Conclusions

Applicants submits that the claims in the above captioned application, 1-44, are in a condition for allowance and the Examiner is respectfully requested to allow claims 1-44.

Applicants' authorize the Commissioner to charge our Deposit Account No. 03-4060 in the total amount of \$1,228.00; \$110.00 for the terminal disclaimer, \$110.00 for a one-month extension, \$774.00 for nine independent claims and \$234.00 for dependent claims. Applicants do not believe any other fees are due in connection with this submission, however, if any fees are required, the Commissioner is authorized to charge any fees, or to credit any overpayment to our Deposit Account No. 03-4060.

Respectfully submitted,

  
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